REMARKS

As a result of the foregoing amendments, independent claim 1 with associated dependent claims 2-16, 44 and 45; independent claim 18 with associated dependent claims 19 and 20; independent claim 21 with associated dependent claims 22, 23, 28-34, 46 and 47; independent claim 36 with associated dependent claims 37, 38, 48 and 49; and independent claim 42 with associated dependent claim 43, remain in the application. Claims 20, 21, and 36 have been amended, and claim 39 has been cancelled.

The invention as defined in all independent claims is directed to the introduction of NaOH AP after a primary, secondary and/or tertiary refiner before further processing, in combination with applying NaOH AP impregnation pre-treatment to lignocellulosic material before refining. Preferably, the post-refiner introduction is in the blow line of a highly pressurized case.

As previously noted, the blow line is identified in Figure 11 with numeric identifier 30, and described on page 7, lines 14-17, as extending between the blow valve and the next processing apparatus, such as a pulp separator. On page 3, at lines 10-18, applicant discusses the preferred embodiment wherein more than one third of total AP in the process, is introduced "at or near the blow valve".

Independent claim 36 has been substantively amended, according to which a high consistency pulp is discharged through a blow valve into an intermediate line, and the post-refiner NaOH AP solution is introduced into the intermediate line and mixed with the pulp therein upstream of any further processing apparatus. Such types of apparatus are mentioned on page 7, line 21 and page 9, lines-10. A bleaching tower could be the only such further apparatus. This claim emphasizes the mixing of lower temperature AP solution with high temperature and consistency pulp, in the intermediate line before any further processing of the refiner discharge. Support is

found in previously presented claims 8 and 11. No previously presented claim contained the combination of features recited in claims 8 and 11.

The amendment to independent claim 42 parallels claim 36, but for a secondary or tertiary refining stage that may not be at as high a temperature or pressure, but still has a blow valve discharge.

Applicant thanks the examiner for the clarity of the stated grounds for rejection. Notwithstanding applicant's disagreement with the basis, the rejection of claims 20 and 21 (and associated dependent claims) under 35 U.S.C. §112 has for the sake of expediency been addressed. As noted above, the specification describes the location of the introduction of the post-refiner AP as possible "at" the blow valve, as well as within three inches to three feet "after" the blow valve. Clearly, this supports any distance from zero (at the blow valve) to about three feet downstream of the blow valve.

Claims 1-11, 18-23, 28-29, 36-39 and 42-49 were rejected under 35 U.S.C. §103 on the basis of the disclosure of U.S. 4,486,267 (Prusas) in view of the disclosure of U.S. 6,743,332 (Haynes), further in view of the disclosure of the technical paper of Cannell. In the final action of record, all independent claims were rejected under 35 U.S.C. §103 on the basis of Prusas and Haynes. Thus, the propriety of the present rejection rests on whether Cannell contains the teaching as asserted by the examiner, and whether one of ordinary skill would be expected to recognize the efficacy of combining Cannell with Prusas and Haynes to arrive at applicant's claimed invention.

The Cannell article discloses an APP (Alkaline Peroxide Pulp) process where alkaline peroxide is added at impregnation with additional peroxide added after refining. The article does state the addition of alkaline/peroxide chemicals can be split between impregnation and post bleaching. While this statement suggests use of alkaline and peroxide in the impregnation stage, it does not teach or suggest introduction at the blow line just after the refiner. This is not disclosed in the Cannell article, nor is it suggested as being useful to add any chemicals just after the refiner. Rather, chemical addition would be at the post-bleaching tower. One reading Cannell would not consider it a

detailed discussion of the technical aspects of the pulping processes, rather an overview of known processes. The figures used suggest only peroxide is added in the second location. If a second alkaline peroxide introduction were considered important to the process, the author would have stated so.

Applicant previously argued that Prusas and Haynes did not suggest post-refiner blow line AP in combination with pre-refiner AP impregnation. Prusas shows pre-refiner AP impregnation and conventional post-refiner bleaching (i.e., tower bleaching). Haynes shows refiner AP and post refiner (intermediate line) AP introduction, but no pre-refiner AP impregnation and no emphasis on the blow valve. There is no teaching or motivation in the record to combine the pre-refining impregnation using AP with introduction of AP in the intermediate line where it mixes with the pulp before any further processing (claims 36 and 42), and especially no such teaching for introducing the AP in the blow line, particularly at or within a feet after the blow valve (claims 1, 18, 21).

On page 3 of the official action, the examiner construes Cannell as teaching that the bleaching stage following primary refining occurs "prior to any other process stages". Figure 2 of Cannell refers to a BCTMP process (which uses sodium sulfite to impregnate the chips). The post primary refiner bleaching is indicated as "interstage bleaching" and the "multistage bleaching" is performed after second or third stage refining and after the process step of screening and cleaning the pulp. Figure 3 is similar. The bleaching is shown with only hydrogen peroxide added (no alkaline addition indicated). These figures do not support the examiner's reading, and do not strengthen the grounds for rejection that applicant previously overcame (Prusas and Haynes).

A better understanding of the meaning of the terms "multistage bleaching" and "interstage bleaching" can be derived from the section of Cannell entitled "Technology Update". Both refer to dedicated bleaching equipment such as bleaching towers. Neither can be construed as including a bleaching process that is continued from the refiner in the intermediate line or initiated in the intermediate line before the bleaching

tower. Applicant's claims require that the AP be introduced and mixed immediately after the blow valve or before any further process component (even a separator or cleaner).

When properly considered, Cannell has the same problem as a reference as does Prusas; there is no teaching of combining the disclosed pre-refining AP chip impregnation, with any type of post-refiner AP in the blow line. Even if one were to speculate based on Cannell that the post-refiner bleaching includes both alkaline and peroxide, there is no suggestion that the chemical addition should immediately follow the refiner, in the blow line.

Applicant emphasizes with respect to independent claims 1, 18, and 21, the recitation that the NaOH AP solution is introduced in the blow line, preferably within three feet after the blow valve, which is the ideal location for thorough mixing of the AP solution with the pulp emerging from the refiner. As set forth on page 3 in the paragraph beginning on line 10, when a substantial fraction of the overall NaOH AP (at least one third) is applied at or near the blow valve in the post refiner intermediate line, in combination with the NaOH AP impregnation of the chips upstream of the refiner, and especially when NaOH AP is also introduced at the refiner, better energy efficiency and more efficient bleaching are achieved relative to the application of all the chemicals before discharge from the refiner. By moving a greater number of chemical reaction downstream relative to conventional techniques, with the improved mixing at the blow valve or at least the blow line, the AP can perform its chemical bleaching with far less a degradation which would other wise occur with AP introduction at or upstream of the refiner in a high pressure refining system. The last paragraph of the Technology Update section of Cannell, implies that in the APP process the front end needs high loading of the AP. Applicant's preferred introduction of at least one third at the AP at the blow line addresses this problem.

The effectiveness of the AP introduction at the blow line is very much dependent on the pretreatment steps recited in applicant's claims. Thus, not only is there no disclosure in any one reference of NaOH AP pretreatment including pressing and

impregnation upstream of the refiner, followed by NaOH AP addition in the blow line, but furthermore, there is no basis among the references for one of ordinary skill to appreciate the particularly efficacious results arising from the combination of such pretreatment with such blow line addition. This is not an arbitrarily selected combination, in that applicant does not assert that introduction of NaOH AP at the refiner followed by NaOH AP in the blow line, without NaOH AP pretreatment, provides any of the special advantages of the claimed invention.

Applicant acknowledges that Prusas discloses NaOH AP in a first pretreatment, but this is followed in Prusas by the steps of removing the alkaline liquor from the chips and then in a second pretreatment step, impregnating the chips with a sulfite liquor and cooking the chips in sulfite liquor. Only after the sulfite cooking, are the chips mechanically refined. The one instance of two-step AP pretreatment cited by the examiner appears as a comparative example showing inferior performance relative to the second step sulfite cooking emphasized and claimed by Prusas. Thus, Prusas teaches away from applicant's invention.

Although Haynes discloses adding AP to the intermediate line while the primary pulp is above 80 deg. C, mixing, and discharging to a retention vessel, Haynes does not disclose any AP pretreatment upstream of the refiner. Prusas removes all AP after first stage pretreatment, but does not remove (merely drains, col. 6, ln. 65) the sulfite liquor on the chips before refining. Haynes uses an alkali that differs from but allegedly gives the same brightness as NaOH. This becomes critical because the Haynes process uses chemicals to give "...greater brightness, improved yield...lower oxalate, COD and BOD concentrations, than is capable with 100% alkalinity derived solely from the sodium hydroxide..." (column 8 lines 4-6). Haynes states that the advantages result when the alkalinity is not from NaOH. Neither Prusas nor Haynes teaches the use of a NaOH AP solution prevailing through the refiner and added in the intermediate line.

Neither of these references provides a nexus to the other such that one of ordinary skill in the art would, without applicant's own specification, recognize the

surprisingly good results that can be achieved by combining the NaOH AP pretreatment upstream of the refiner, with NaOH AP introduction in the blow line, especially in a system having a pressurize primary refiner. As noted above, the newly cited Cannell paper does not strengthen the previous rejection, which applicant has evidently overcome.

For these reasons, Prusas, Haynes, and Cannell are not properly combinable, and the rejection of claims 1-11, 18-23, 28-29, 36-38 and 42-49 on this basis should be withdrawn.

Claims 12-16 and 30-34 were rejected under 35 U.S.C. §103 on the basis of Prusas and Haynes, further in view of Cannell, plus the disclosures of three other patents or publications. These claims depend indirectly from one of the independent claims 1 or 21. At this time, applicant repeats the point that the fundamental basis for the rejection, the combination of Prusas, Haynes, and Cannell is fatally flawed. Therefore, if the independent claims 1 and 21 are patentable over the cited combination under 35 U.S.C. §103, claims that depend directly or indirectly from claims 1 or 21 are likewise patentable under 35 U.S.C. §103.

For the foregoing reasons, applicant believes all claims are in condition for allowance.

Respectfully submitted,

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